ELV8e Installation Manual

8-Channel Ethernet Controlled
Low Cost ELV Relay

The ELV8e is a simple low cost 8-channel ELV (Extra Low Voltage) relay, controlled via Ethernet

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White Creations ELV Relay Range

ELV8s	8 Channel Low Cost RS-232 controlled ELV Relay
ELV8e	8 Channel Low Cost Ethernet controlled ELV Relay
ELVi4s	4 Channel Industrial-Grade Serial controlled ELV Relay
ELVi4e	4 Channel Industrial-Grade Ethernet controlled ELV Relay
ELVi8s	8 Channel Industrial-Grade Serial controlled ELV Relay
ELVi8e	8 Channel Industrial-Grade Ethernet controlled ELV Relay

Disclaimer & Conditions of Use:

White Creations ELV Relay products are not intended for use where there may be any risk to persons or property. White Creations will not be held liable for any injury or damage to property caused by our products.

You must use White Creations products only in non-crucial (or "convenience") elements of a system - where a failure may inconvenience the user, but not directly or indirectly cause damage to any property or injury to any persons.

Do Not Open Device! No User Serviceable Parts inside. Opening the device for any reason will void any warranties. For technical support or product faults please contact whitecreations.com.au/techsupport

This manual is subject to change without notice; the latest version is available at whitecreations.com.au/manuals

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Low Cost ELV Relay Features

Our Low Cost ELV Relay has been developed with the installer in mind. We have tried to make it really easy for installers to install, and programmers to integrate with. We have also tried to provide this at the lowest possible price.

For Installers:

- Quality pluggable screw terminal connectors - easy to install, replace, debug, and fault-find
- Local toggle mode for easy debugging and fault-finding
- LED indicators for status of each relay
- Normally Open terminals for each relay

For Programmers:

- Easy ASCII string to control relays
- Simple 'No Frills' control - discretely set each relay ON or OFF
- Easily configure Ethernet models by connecting to it through a web browser

For Everyone:

- Well priced
- Very reliable
- Great Australian support

Please note: Units are not shipped with 12V Power Supply

- Multiple units can operate from a single 12V power supply, so instead of providing one with each unit, you can install them as needed.

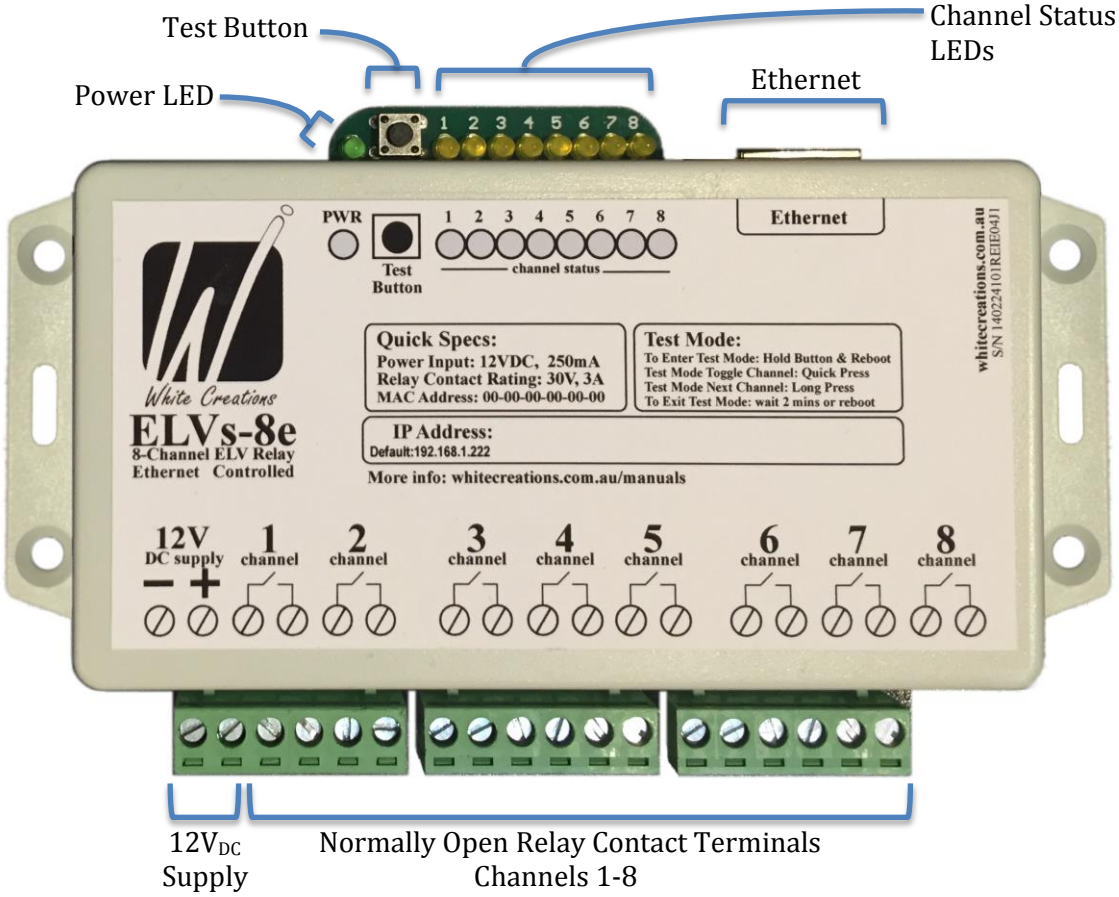
- Please make sure the power supply has a sufficient current rating, taking other equipment into account if applicable. For example, the IN8e requires 100mA, so a 1000mA power supply can power up to 10 units.

ELV8e Specifications

Relay channels: 8
Relay terminals: 8x Normally Open Contacts
Control: Ethernet TCP/IP
Default IP Address: 192.168.1.222
Default port: 10001
Max Ambient Temp: 40^{0}C

Relay output rating: 30V, 3A
Operating Voltage: 12V DC
Operating Current: 250mA max
Physical Dimensions:
146mm x 91mm x 40mm (including connectors)

ELV8e Top View



Hardware Interfaces:

- Test Button: Press the Test Button while rebooting to enter Test Mode (See Testing Hardware Installation)
- Power LED: In Normal Mode, the Power LED is ON with a quick blink off when a command is received. In Test Mode, it will flash
- Ethernet: RJ45 connection to Ethernet network
- 12V DC Supply: DC power supply input terminals
- Channel Status LEDs: Indicate the current status of each relay channel
- Relay Contact Terminals: Dry contact relay output terminals – normally open connection for each relay, rated at 30V AC or DC, 3A

Hardware Installation

1. Mount ELV8e firmly in a dry indoor climate
2. Wire relay terminals to desired control devices
3. Wire power supply and connect device to Ethernet network

Testing Hardware Installation

There are two modes you can boot into: Test Mode and Normal Mode

You can easily test your installation by booting into Test Mode. This will allow you to manually toggle relay channels, even if the ELV8e is not configured or connected to an Ethernet network.

Normal Mode is used for normal operation. The ELV8e will always default to Normal Mode.

Boot Up to Normal Mode:

Simply power up without the test button pushed.
The ELV8e will also return to Normal Mode after 2 minutes of inactivity in Test Mode.

Using Normal Mode:

While in normal mode, all Ethernet commands are processed, and the Test Button is ignored. The Power LED will be on solid, with a quick blink off when it receives a command.

Boot Up to Test Mode:

1. De-power ELV8e
2. Press and hold the Test Button
3. Power up unit while continuing to hold the Test Button
4. 2 seconds after the ELV8e powers up, release the Test Button. The device is now in Test Mode. The Test Mode sequence will run, turning each relay channel on and then off in turn. The Power LED will then start blinking to indicate that it is in Test Mode

Using Test Mode:

You can press the Test Button in one of two ways:

- A “quick-press” means you press and release the button within 0.5 seconds
- A “long-press” means you press and hold the button for at least 1 full second and then release.

Once the ELV8e boots into Test Mode, a quick-press of the Test Button will now toggle relay channel 1. You may quick-press as many times as you like to keep toggling channel 1. A long-press will set the button to control channel 2. Quick-presses will now toggle relay 2. You can long-press to cycle through all relay channels. A long-press while controlling channel 8 will return control to channel 1, where the cycle repeats. The ELV8e will automatically exit Test Mode after 2 minutes of Test Button inactivity.

While in Test Mode, Ethernet commands are ignored.

To exit Test Mode, power cycle the ELV8e without the Test Button pushed, or wait 2 minutes.

Quick Reference Table - Normal and Test Modes

	Normal Mode	Test Mode
How to boot to	Power up without the Test Button pushed	Power up with the Test Button pushed
How to exit	Boot to Test Mode	Boot to Normal Mode or wait 2 minutes
Power LED	On	Flashing
Ethernet control	Controls relay channels	Ignored
Test Button	Ignored	Short-press: toggles selected relay channel Long-press: cycles through which relay to control

Ethernet Configuration

The Ethernet settings of the ELV8e are configured by its configuration web page. There are 2 ways to connect to the ELV8e for the first time. Below is a quick overview of the 2 methods, and there are detailed procedures on the following pages.

Methods for connecting to the ELV8e for the first time:

Method 1: Connect via Ethernet Network

- If your PC is on a network in the range 192.168.1.xxx and there is no device at 192.168.1.222, then you can plug the ELV8e into the network, and open its configuration web page by typing its IP address into a web browser. If your PC network is not in that range, you will first have to connect via Direct Connect, and change the IP configuration of the ELV8e to be in the range of your network

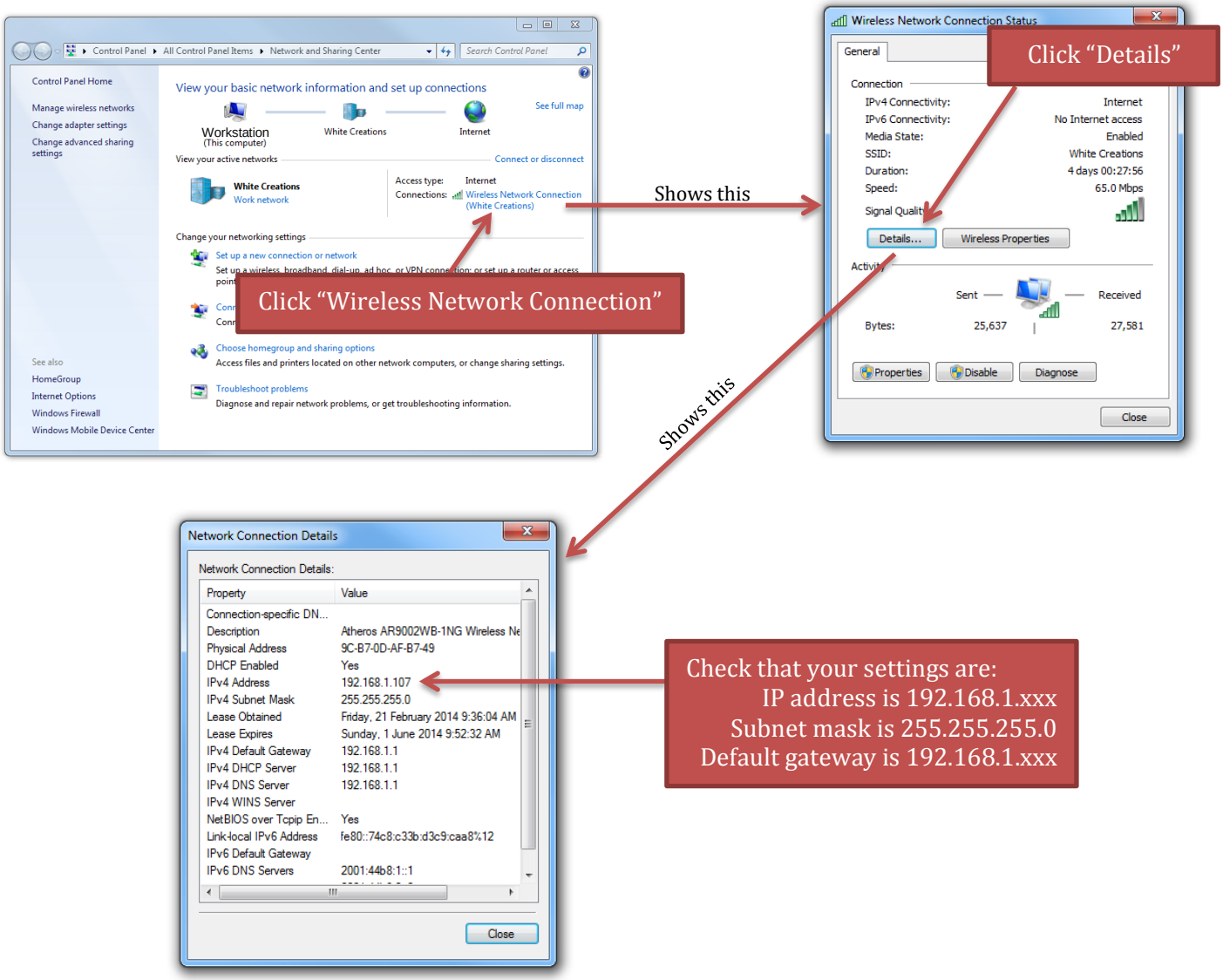
Method 2: Connect via Direct Connect

- You can directly connect by plugging the ELV8e directly to your PC with a crossover Ethernet cable. You will need to assign a static IP address to your computer in the 192.168.1.xxx range, and then you can open the ELV8e configuration web page by typing its IP address into a web browser

Once your PC is on the same network and in the same IP range as the ELV8e, you can access the ELV8e configuration web page (see *Configuring the ELV8e*), or you can start controlling relay channels by connecting to it with a terminal program and sending it control strings (see *TCP/IP Protocol*).

Method 1: Connecting to the ELV8e for the first time via Ethernet Network

1. Check if your PC is on a network in the IP range 192.168.1.xxx
   Click Start >> Control Panel >> Network and Sharing Center

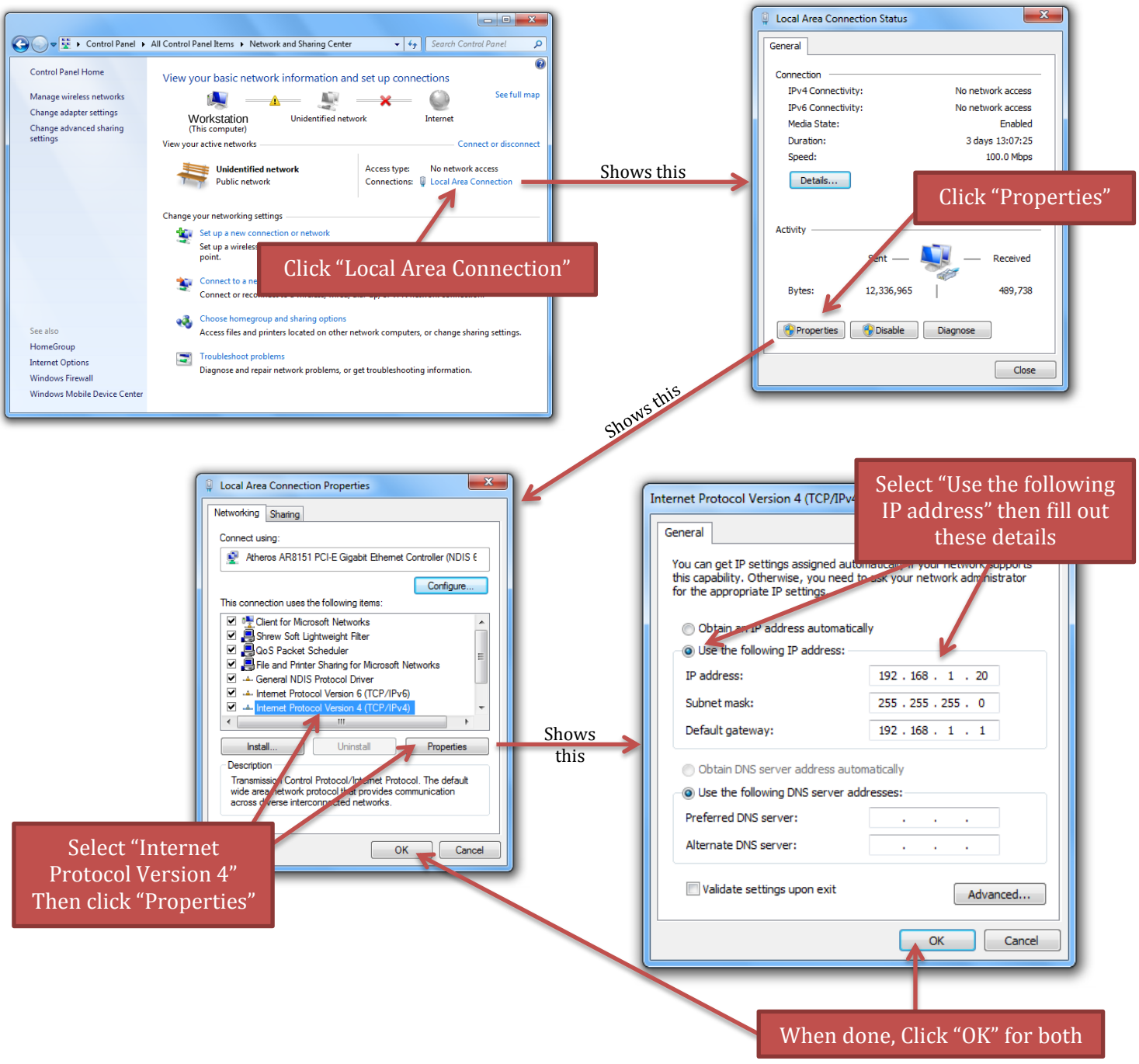


2. If your PC is in the 192.168.1.xxx range, then proceed to the next step. If not then you may have to connect and configure the ELV8e using the Direct Connect method. You could then change the network configuration of the ELV8e to be in the same IP range as your Ethernet network and then you can connect to it this way
3. Check that there is no network device present at 192.168.1.222
   a. Click Start, type "cmd" and hit enter
   b. In the command prompt, type "ping 192.168.1.222" and hit enter
   c. The response will tell you if this IP address is in use. (if the response is "Reply from 192.168.1.222…" then there is a device at that IP address, if the response is "Request timed out" or "Reply from < other IP address>", then the IP address is free
4. Disconnect any device at 192.168.1.222 if present, then plug the ELV8e into the network
5. You can now connect to the ELV8e. You can configure settings by typing its IP address into a web browser (see *Configuring The ELV8e*), or you can start controlling relay channels by connecting to it with a terminal program and sending it control strings (see *TCP/IP Protocol*)

*Tip: Using smartphone apps like **Fing** make it really easy to scan the IP addresses on your network*

Method 2: Connecting to the ELV8e for the first time via Direct Connect

1. Disconnect your PC from any hardwired or wireless networks
2. Use a crossover Ethernet cable to connect the ELV8e to your PC Ethernet port, then power up the ELV8e. *(note: on modern PC's a straight through cable may also work)*
3. Set your PC's IP address to static and give it an IP address Click Start >> Control Panel >> Network and Sharing Center



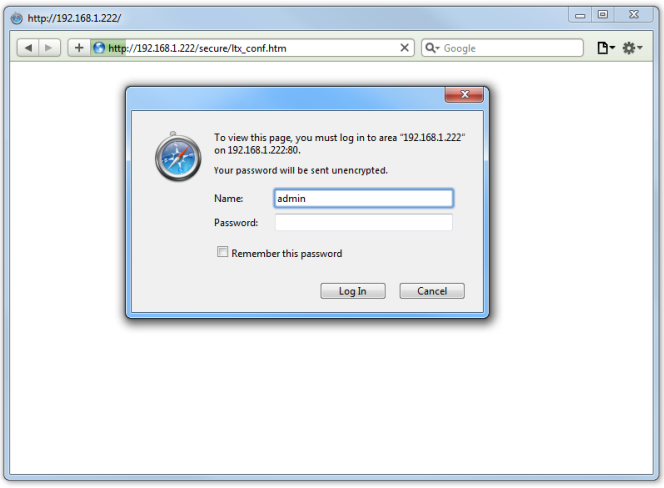
4. You can now connect to the ELV8e. You can configure settings by typing its IP address into a web browser (see *Configuring The ELV8e*), or you can start controlling relay channels by connecting to it with a terminal program and sending it control strings (see *TCP/IP Protocol*)

Note: to re-connect to your existing wired or wireless network, you need to restore your PCs IP settings back to what they were, usually you would have to follow the same procedure as above, but select "Obtain IP address automatically" and "Obtain DNS server address automatically"

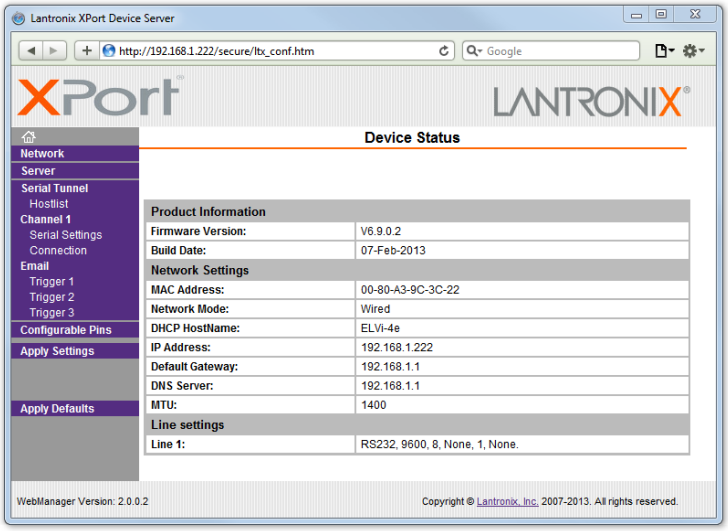
Configuring the ELV8e

Once your PC is on the same network as the ELV8e and in the same IP range, you can access the ELV8e configuration web page to change the network settings.

Open your web browser (internet explorer, safari, etc) and type in the ELV8e IP address into the browser address bar (default IP address is 192.168.1.222). When prompted, enter the user name “admin” and the password and click “Log In” (the default password is <blank>).



You now have the ELV8e web configuration page, which appears like this. (The Ethernet processor of the ELV8e is the Lantronix XPort chipset, hence their branding on the web page).



The home page shows an overview of the current network settings, while the left hand pane navigates through all the pages of settings of the ELV8e.

Configuration Settings

The following pages are available containing configuration settings:

- **Home** – Shows an overview of current network settings
- **Network** – Contains user-configurable network settings (DHCP/Static, IP Address, etc)
- **Server** – Contains user-configurable web server settings (web configuration password, etc.)
- **Serial Tunnel**
  - **Hostlist** – Advanced use only – for specifying host devices for the ELV8e to initiate a connection to
- **Channel 1**
  - **Serial Settings:** Contains factory-configured settings. Do not change any of these settings as it will cause the ELV8e to malfunction. If you do accidentally change these settings, you should hit "Apply Defaults" to restore them to factory configuration. Please note that this will reset any other changes you have made
  - **Connection:** advanced use only – network communication settings (TCP/UDP, Client/Server, port number, etc.)
- **Email** – Future use, please contact us if you're interested
- **Configurable Pins** – Future use, please contact us if you're interested
- **Apply Settings** – Once you've changed settings on a page, you need to hit "OK" at the bottom of the page, then "Apply Settings" to save and reboot. This will disconnect any current TCP/IP connections
- **Apply Defaults** – Sets all settings back to factory defaults, except IP Address which changes to DHCP

Common Configuration Settings

The most common way to use the ELV8e is as a TCP server, which means it continually waits for an incoming connection. A TCP client will then connect to it, send control strings, and disconnect as needed. To run in this configuration you can either use the default settings (no configuration necessary), or configure these settings:

- Set ELV8e to DHCP or Static, set IP address, subnet mask, Default Gateway, DNS Server. Using a static IP address is recommended
  - In "Network" page (See *Network Settings Parameter Descriptions –next page*)
- Set a password for the ELV8e configuration web pages
  - In the "Server" page (See *Server Settings Parameter Descriptions* –next page)

Advanced Configuration Settings

Advanced configuration settings are available but shouldn't be changed unless there is a specific reason to change them. This manual does not go into details for advanced settings. If you have an installation where advanced configuration is required, please contact White Creations for the advanced user manual.

Network Settings Parameter Descriptions

- **IP Configuration:**
  - **Obtain IP Address Automatically**: When enabled, you can change the Auto Configuration Methods, and DHCP Host Name. Note: If you need to change the Auto Configuration Method settings do not disable all 3 methods, as the only method will then be ARP (default is all enabled, leaving them all enabled is recommended)
  - **Use the following IP configuration**: When enabled, you can specify a static IP address, Subnet Mask, Default Gateway, and DNS Server. Enter these parameters in decimal-dot notation. The IP Address must be set to a unique value on the network
- **Ethernet Configuration**:
  - **Auto Negotiate**: For advanced users only, please leave this option enabled unless you have a specific reason to change it

Server Settings Parameter Descriptions

- **Server Configuration:**
  - **Enhanced Password:** When enabled you can create a password up to 16 characters in length, when disabled you will be limited to 4 characters
  - **Telnet/Web Manager Password:** This is the ELV8e configuration web page access password. Choose a password you will not forget as there is no external reset – the only way to factory default the ELV8e without the web manager password is to send it back to White Creations, in South Australia
  - **Retype Password:** Retype the Telnet/Web Manager password above to confirm
- **Advanced:** For advanced users only, please leave at default values unless you have a specific reason to change them

Saving Changes

Once you've changed settings on a page, you need to hit "OK" at the bottom of the page, then "Apply Settings" to save and reboot. This will disconnect any current TCP/IP connections.

Please do not change any settings unless you understand what they do. If you need some support please contact White Creations Technical Support: whitecreations.com.au/techsupport

TCP/IP Connections

To control the ELV8e relay channels, you can connect to it via its IP address and port number, and send it the appropriate control string. There are many devices capable of sending TCP/IP strings to Ethernet devices like the ELV8e including:

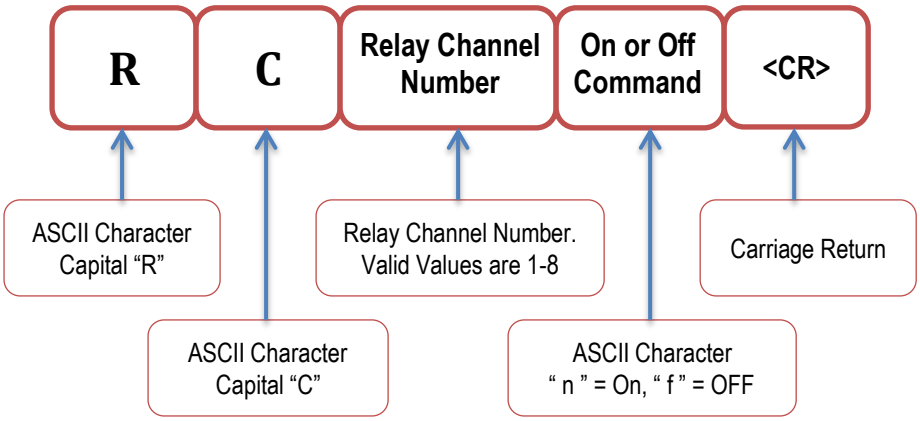
- Automation and Control Systems (eg. Crestron, AMX, C-Bus, push, control4, etc)
- Smartphone apps (eg. Command Fusion iViewer, TCP/IP remote, etc)
- A PC running a TCP/IP terminal program (eg. Realterm)

Default Network Settings
IP Address: 192.168.1.222
Subnet Mask: 255.255.255.0
Default Gateway: 192.168.1.1
DNS Server: 192.168.1.1
Control Port: 10001
Web Port: 80

TCP/IP Protocol

You may send a 5-byte TCP/IP string to the ELV8e to turn on or off the relay channels. There must be an 80ms or greater delay between command strings.

The command sting consists of 5 ASCII characters, and is in this format:


R
C
Relay Channel Number
On or Off Command
<CR>
ASCII Character Capital "R"
Relay Channel Number. Valid Values are 1-8
Carriage Return
ASCII Character Capital "C"
ASCII Character " n " = On, " f " = OFF

Command Table

The following shows all available commands you can send to an ELV8e relay unit.
Note that <CR> represents the ASCII character for a carriage return (hex 0D)

Available Commands	**String to send to device**
Relay Channel 1 On	RC1n<CR>
Relay Channel 1 Off	RC1f<CR>
Relay Channel 2 On	RC2n<CR>
Relay Channel 2 Off	RC2f<CR>
Relay Channel 3 On	RC3n<CR>
Relay Channel 3 Off	RC3f<CR>
Relay Channel 4 On	RC4n<CR>
Relay Channel 4 Off	RC4f<CR>
Relay Channel 5 On	RC5n<CR>
Relay Channel 5 Off	RC5f<CR>
Relay Channel 6 On	RC6n<CR>
Relay Channel 6 Off	RC6f<CR>
Relay Channel 7 On	RC7n<CR>
Relay Channel 7 Off	RC7f<CR>
Relay Channel 8 On	RC8n<CR>
Relay Channel 8 Off	RC8f<CR>
All Relay Channels On	RCan<CR>
All Relay Channels Off	RCaf<CR>
Get Status Of All Relay Channels	RCgs<CR>

Response from the ELV8e

Once a valid command string has been received by the ELV8e, it will respond indicating which channel was last set. If the device does not recognize a string, it may return the string “Invalid command”.

Examples

To turn on relay channel 1 of the ELV8e, send the string:
RC1n<CR>
The ELV8e will respond with:
Channel 1 is On<CR>

To turn off relay channel 7 of the ELV8e, send the string:
RC7f<CR>
The ELV8e will respond with:
Channel 7 is Off<CR>

To get the status of all relay channels of the ELV8e, send the string:
RCgs<CR>
The ELV8e will respond with the current state of each relay channel, in the format:

Channel 1 is Off<CR> Channel 5 is On<CR>
Channel 2 is Off<CR> Channel 6 is On<CR>
Channel 3 is Off<CR> Channel 7 is On<CR>
Channel 4 is Off<CR> Channel 8 is On<CR>

Remote Control and Port Forwarding

The ELV8e can be controlled remotely by setting up port forwarding in the remote site's internet router. The IT department can open an external port to point to the internal IP address and port of the ELV8e. You can then connect to the ELV8e through the internet from another location, using the external IP address of the site and the external port assigned to you. Port 80 must be forwarded for access to the configuration web page, and port 10001 must be forwarded to control relay channels.

Note: Port 80 and 10001 are the default ports used by the ELV8e. If you can't communicate on these ports, the installer may have changed them.

For domestic applications, most decent internet routers will allow port forwarding, but you may need to set up a dyndns (or similar) account to keep track of your external IP address. This manual does not go into specific details as each router is different. You should 'google' your router model to find information to set this up. If you need some support, please contact White Creations Technical Support: whitecreations.com.au/techsupport.

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